PATENT SPECIFICATION

Convention Date (United States): Jan. 26, 1939.

538,187

Application Date (in United Kingdom): Jan. 17, 1940. No. 1048/40.

Complete Specification Accepted: July 24, 1941.

COMPLETE SPECIFICATION

Improvements in or relating to Agitators for Ice Cream Freezers and other Machines

We, CHERRY-BURRELL CORPORATION, a Corporation organized under the Laws of the State of Delaware, United States of America, of 427, West Randolph Street, City of Chicago, State of Illinois, United States of America, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

The present invention relates to agitators for ice cream freezers and other machines, and the invention also relates to improvements in ice cream freezers and other machines including such agitators. More particularly the invention relates to a new and novel sanitary agitating mechanism, and means for rotatively mounting the agitating mechanism and sealing the same within the processing chamber.

In accordance with the present invention, the improved agitator for ice cream freezers and other machines, includes inner and outer separable members, and driving and supporting means for the outer member detachably affixed thereto and rotatively supporting the corresponding end of the inner member, whereby when the driving means is detached from the outer member, the inner member may be separated from the outer member.

The present invention also provides an improved agitator for ice cream freezers and other machines, including inner and outer separable members, and driving means and a supporting means for the outer member with the separating means detachably affixed thereto and rotatively supporting the outer separable member on the inner member, whereby, when the supporting means is detached from the outer member, the inner member may be separated from the outer member.

In ice cream freezers of the type referred to, such, for example, as direct expansion batch freezers of the horizontal cylinder type, it is essential that the ice cream mix agitating mechanism be of a sanitary construction, easily removed from the cylinder and easily cleaned; and in which all of the agitating, scraping, beating and unloading mechanism is provided in a form free from unsanitary crevices, etc. In the operation of such a machine, it is also essential that the openings through which the driving and supporting shafts enter the freezing chamber for the operation and support of the agitating mechanism therein enter the same through satisfactorily and sanitarily sealed openings whereby the easy removal of the agitating mechanism from the processing chamber and dismantling thereof for cleaning purposes are facilitated. It is also essential in a freezer of the type referred to that the evaporator and the means for quickly putting the refrigeration action into and out of operation be adaptable to the quick repeated operation incidental to the normal use of batch freezers, attaining maximum efficiency almost instantaneously, and subject to close regulation of the operator. The accompanying drawings illustrate the invention in an ice cream freezer of this type; however, the invention is not to be limited to the specific embodiment disclosed.

The principal objects of the present invention are to provide an ice cream freezer of simple, efficient design wherein the operator has close control of the freezing process and the operation of the freezing mechanism; in which the inner agitator or whipping device is firmly but removably retained in operative position in the outer agitator device by automatically adjustable spring loaded mechanism, rotatively sealing the inner and outer agitating mechanism one to another at the entrance into the processing chamber of the driving and supporting mechanism for the inner dasher; in which the combined inner and outer agitator mechanism when assembled in the freezer is firmly but removably maintained in operative position and rotatively sealed to the end plate of the processing chamber around the entrance aperture for the compound agitator driving mechanism by automatically adjustable spring loaded mechanism, and in which the inner and outer dasher and scraper mechanisms are separately driven with a special selective drive for the inner

[Price 1/-]

dasher mechanism.

Other objects and purposes and other important features of the invention will be apparent from the following description when read in connection with the accompanying drawings in which:

Figure 1 is a longitudinal section view taken vertically through the freezer.

Figure 2 is a section view taken vertically through the automatic thermal refrigerant valve for the freezer.

Figure 3 is a plan view of the completely assembled agitation mechanism with one set of unloading wings turned uppermost.

Figure 4 is an enlarged detail section view of the front and rear portion of the agitating mechanism and supporting bearings taken vertically through the dasher along line 4—4 of Figure 3.

Figure 5 is an end view of the agitating mechanism showing the inner surface of the freezer in dotted lines and the relation of the scraping mechanism thereto when the freezer is in operative condition.

Figure 6 is a transverse elevation view of the agitating mechanism taken along the line 6—6 of Figure 3.

Figure 7 is a view of the various elements of the agitating mechanism in dismantled arrangement separated in relative position of assembly.

Figure 8 is an elevation view of the inner face of the rear portion of the separable rear end plate or dasher supporting member.

Figure 9 is an elevation view of the inner face of the front portion of the separable rear end plate or dasher supporting member.

I. Freezer Support and Driving Mechanism.

Referring to the accompanying drawings showing the preferred embodiment of the invention, in which drawings like numerals are associated with like elements, the invention in its preferred form, as illustrated in Figure 1, comprises an ice cream freezer supported on a hollow base 10 resting on adjustable feet 11. A gear housing 12 is provided at the upper rear portion of the base, and a cylinder supporting bracket 13 is provided immediately ahead of the gear housing 12, together with a cylinder supporting shelf portion 14 immediately ahead of the bracket 13, above which shelf is mounted the cylinder structure generally indicated by the numeral 15 applied to its envelope. The freezer is driven by motor 16 housed in the hollow base 10 and mounted on any suitable bracket 17. The motor 16 through a series of belts 18 drives the pulley 19 which is keyed to drive shaft 20 journaled in suitable bearings in the gear housing 12. Pinion 21 is carried by and keyed to the drive shaft 20 and drives the spur gear 22 carried by a quill or hollow shaft 23 journaled in any suitable sleeve bearing 24 mounted directly above drive shaft 20 with the quill shaft 23 opening outwardly through the front wall of the gear housing 12. Quill shaft 23 is joined at its inner end to the adjoining free inner end of a second axially alined shaft 25, which is partially telescoped into quill shaft 23 and there supported in alinement by a suitable rotary thrust bearing 26. The outer end of the shaft 25 is journaled in any suitable bearing generally indicated by the numeral 27. Sprocket wheel 28 fixed to and carried by shaft 25 is driven by sprocket chain 29 which passes around a driving sprocket 30 driven through the intermediacy of the disc clutch generally indicated by the numeral 31 on which it is mounted. Disc clutch 31 is mounted on the drive shaft 20 and actuated by lever 32 pivoted at 33 and hinged at its free end to the control rod 34 extending outwardly through the front wall of the base 10 toward the position occupied by an operator of the freezer.

The inner shaft 35 and quill shaft 36 are the shafts used to drive the inner and outer elements of the reversely rotating agitating mechanism of the freezer. These shafts are telescoped at their free ends into the squared sockets of the shafts 25 and 23 respectively by means of which squared faces the reversely rotating spur gear 22 and sprocket wheel 28 impart the reverse rotation to the shafts 36 and 35 respectively to operate the inner and outer dasher elements.

II. Freezing Tube and Evaporator.

The processing cylinder construction comprises an outer envelope 15 and an inner processing shell 37 which serves as a refrigerated wall or cylinder housing the freezing chamber of the freezer. The shell 37 is surrounded by a refrigerant evaporator "C" in intimate contact therewith and spaced from envelope 15, in which space a satisfactory cover or insulation 38 is provided. Shell 37 is provided at its front end with an annular head 39, and at its opposite end with a centrally apertured head 40. Heads 39 and 40 are affixed to shell 37 and envelope 15 by any suitable means, such, for example, as welding, and head 40 is rigidly affixed to the cylinder support bracket 13 by a series of bolts. A removable end wall or door 41 including the usual inlet passage 42 and outlet passage 43 is hinged in the conventional manner to the front cylinder head 39. The outlet passage 43 is closed by valve 44, and

the inlet passage 42 is associated with the usual type of mix reservoir 45 through the conventional type of valve 46 all of which are clearly shown in Figure 1. The end wall 41 is provided with a conical, central, inwardly directed bearing support 47 which supports the front end of the agitator mechanism within the shell 37.

III. AGITATOR.

The agitating, whipping, scraping and unloading mechanism on the inside of the processing cylinder or shell 37, consists generally of an outer dasher agitator or scraping and unloading member, and an inner dasher or agitator, whipping and beating member, which members are arranged to rotate in opposite directions. The rear head 40 of cylinder 37 is provided with a rearwardly extending bearing neck 48 about the central aperture 49 to rotatively support the quill shaft 36 and inner shaft 35, which shafts 35 and 36 drive the inner and outer dasher members. On the end of the quill shaft 36 extending into the shell 37 is provided a centrally apertured axially alined end plate or spider 50, Figs. 3 and 4, which is formed integrally with the quill shaft 36 and to which the outer dasher mechanism support ring or annulus 51 is removably affixed by stud bolt 52 carried by end plate 50. The ring or annulus 51 is provided with two diametrically opposed, recessed brackets 109 into which recesses the rear portions of two parallel unloading bars 53 are affixed which bars are arranged parallel with the axis of rotation of the agitator mechnism having their outer faces closely adjacent to the inner periphery of processing shell 37. The parts 53 on their outer surfaces carry diagonally disposed unloading wings 54, which wings 54 extend into close proximity of the shell 37, and are so disposed angularly with respect to the axis of rotation of the agitator mechanism as to impel the contents of the processing shell 37 forwardly upon the rotation of the outer dasher or agitator mechanism. The front ends of the unloading bars 53 are affixed to the front support spider 55, which is provided with two pairs of oppositely directed arms arranged at right angles to each other mounted on a centrally apertured hub 56. The one pair of arms of front spider 55 are provided at their outer ends with recessed brackets 109^1 to support the front end of the unloading bars 53. These supporting arms are inclined to the axis of the dasher mechanism so as to impel the contents of the shell 37 rearwardly upon rotation of the outer dasher mechanism, in contrast to the forward motion imparted to the contents of the shell 37 by the unloading wings 54. The remaining pair of arms of the front spider 55 extend outwardly t... wards the inner periphery of the shell 37, and are provided at their outer ends with apertures 107 constituting bearings for the front end pivots 57 of the scraping blades 58, which blades may be of any conventional type. Pivots 57 are mounted in offsets at the rear edge of the blade 58 and the front leading edge of the blade extends through the kerf 50, Fig. 5, of the bifurcated ends 60 of the blade supporting arms of the spider 55, whereby the rotation of the blades 58 about the pivots 57 is limited and the position of the blades 58 with respect to the remaining portions of the dasher mechanism is predetermined. The rear pivots 57 of the blades 58 are supported in diametrically opposed lugs 61 on the outer periphery of the rear supporting spider or plate 50. Lugs 61 are disposed at an angle of 90° from unloading bar support brackets 109 on the annulus 51, which is removably affixed to the end plate or spider 50. The lugs 61 are provided with bearing apertures 62 for the rear pivots 57 of the scraping blade 58. The inner shaft 35 of the agitator mechanism is supported at its front end by a conical stud bearing 63 mounted free to rotate on the front end of shaft 35 and telescoping into the conical bearing seat 47 in the door 41. At its opposite end the inner shaft 35 is supported in a bushing 64 recessed into the inner end of the quill shaft 36. Bushing 64 is provided with an outwardly turned flange 65 overlapping the central portion of the front face of the rear supporting spider or plate 50. Two sets of beater blades 66 and 67 are mounted at spaced intervals along the central portion of shaft 35, alternately arranged, with one set disposed at an angle of 90° to the other. The beater blades 66 and 67 are so inclined to the axis of shaft 35 that upon rotation thereof they will impel the contents of the shell 37 in a rearwardly direction. To facilitate and supplement the whipping of the ice cream, whipping rods 68 are provided. These rods are carried in pairs by the beater blades 66 and 67 by passing them through openings 69 in the blades, to which blades they may be affixed by any suitable means, such, for example, as by welding. The rear free ends of all the whipping rods 68 are secured to a 4-arm spider 70 mounted on shaft 35 adjacent the end plate 50.

The apertured hub 56, Fig. 4, for the front spider 55 is provided with a squared inner surface to engage the squared outer surface 71 of the bushing 72 freely mounted on the shaft 35 to rotate with and support the front end of

the outer dasher mechanism upon the front end of the shaft 35. The bushing 72 on its inner end is provided with transverse oppositely disposed slots 73, which engage the lug 74 of the annulus 75 mounted on shaft 35 inwardly of the bushing 72 and abutting against the hub of the front beater blades 66. The annulus 75 is provided with an outwardly extending flange 76 intermediate which flange, and the adjacent face of the hub 56, a coil spring 77 is mounted telescopically upon the end of bushing 72 and over shaft 35. Shaft 35 is biased for rearward motion relative to the outer dasher mechanism by spring 77 to assure the engaging of the annlus 106, keyed to the rear portion of shaft 35, in a sealing engagement with the outwardly turned flange 65 of bushing 64 recessed in the inner end of the quill shaft 36. The front end of the bushing 72 abuts against the rear face of the stud bearing 63, which is freely mounted on shaft 35 and locked thereon by key ring 78 removably mounted in a groove 79 in the extreme front portion of the shaft 35. The front end of bushing 72 is provided with an outwardly turned flange 80 to retain a second coil spring 81, which embraces the outer portion of bushing 72, intermediate the outwardly turned flange 80 and the adjacent face of the hub 56 of the front spider 55. Upon closing the door 41 affixed to the front head 39 of shell 37 the conical bearing seat 47 engages the freely mounted stud bearing 63 moving it rearwardly on the shaft 35 together with the freely mounted bushing 72 as the closing of the door 41 progresses. This procedure compresses the coil spring 81 to bias the outer dasher assembly for motion in a rearward direction, thereby sealingly engaging the rear face of spider 50 with the annular sealing element 82 in the front inner face of the rear cylinder head 40. By this arrangement the sealing of the rotary elements sealing the entrance apertures for the quill shaft 36 through the rear cylinder head 40 and the aperture for the shaft 35 through the quill shaft 36 is assured.

IV. Cooling System.

It is of course obvious that the evaporator " C " may be supplied with various types of cooling agents to effect a satisfactory operation of the freezing processes within the shell 37. However, the illustrations clearly set out a portion of an ammonia compression system and the controls therefor.

In the preferred embodiment of the invention as illustrated high pressure liquid anhydrous ammonia is supplied from any satisfactory compressor condenser unit (not shown) through supply pipe 83, from which it passes through a coil 84 of the precooler 85, thence through a conduit 86 to a needle valve 87 provided with a bypass through which bypass the liquid may pass during normal automatic operation to valve 88 through conduit 89, thence through an automatic liquid refrigerant flow regulating valve 90 to a control valve 91 through conduit 92, and thence through the special evaporator connection 93 from which it passes through the evaporator inlet port 113 into the passage 110 of evaporator " C ".

The refrigerant which has passed through the evaporator " C " is discharged from the port of the evaporator through conduit 94 to the precooler 85, in which any unevaporated liquid refrigerant will be evaporated by precooling the liquid refrigerant supply in coil 84. From precooler 85 the refrigerant gas is discharged to the compressor condenser unit (not shown) through conduit 95.

As a matter of safety, a poppet valve 96, conventionally referred to as a safety valve, is joined to conduit 92 by special conduit 97, and arranged to discharge, when in operation, into the exhaust conduit 94. Valve 96 as just stated is of the conventional safety type valve, and is so adjusted as to limit the liquid pressure in conduit 92 to a predetermined value.

The automatic thermal liquid flow valve 90, as illustrated in detail in Figure 2, is in the refrigerant supply line and is of a known commercial type, and the details thereof do not form a part of this invention. Valve 90 will be described only sufficiently to indicate that the liquid passing through the valve is regulated by a conical valve 98 seating in a conical valve seat in the flow passage 100. The movement of the valve 98 is controlled through valve stem 101, which is fixed to a spring loaded diaphragm 102 actuated by the pressure exerted upon it by the fluid in tube 104 communicating with the thermal sensitive bulb 103 mounted in heat exchange relation on the exhaust conduit 94.

In the event that it is desired to manually operate the evaporator " C ", the valve 88 ahead of the automatic thermal valve 90 is closed, and the needle valve 87 is adjusted to regulate a flow of liquid refrigerant to the conduit 92 as desired through the conduit 105 connected to the discharge port of the needle valve. The inlet port of valve 87 is associated with the beforementioned bypass, forming a part thereof, which bypass is not shown but is constructed in accordance with conventional valve design.

In the conventional type of freezer it is

common practice to provide packing glands to seal ports of entrance of the agitator drive shafts into the freezing chamber. Such packing glands usually embody certain unsanitary features. In the present invention, sanitary automatically adjustable rotary seals are provided which permit the removal and thorough cleaning of all working parts which contact the material handled within the processing chamber. This is considered an important improvement in that in the normal operation of an ice cream freezer it is essential that all parts which contact the ice cream must be frequently cleaned, in which instance it is of course necessary to remove such parts from the freezing cylinder. To facilitate the cleaning of the agitating mechanism, it has been made demountable, as clearly shown in Figure 7. From Figure 7, it will be apparent that in assembling the agitator mechanism, the inner shaft 35, carrying the inner dasher mechanism at its midportion, is telescoped into the quill drive shaft 36, with the rear sealing bearing 106 fixed to the shaft 35 immediately behind the inner agitator mechanism contacting the flange 65 of bushing 64 recessed into the quill shaft 36 and abutting against the front face of the rear spider 50 formed integrally with the quill shaft 36. Annulus 75 and spring 77 are then telescoped over the front end of shaft 35 and the outer dasher assembly is telescoped over the inner dasher assembly with the hub 56 of the front spider 55 telescoping over the front end of the shaft 35 until the stud bolts 52 on the rear end spider 50 have engaged the associated bolt holes 108 in the rear supporting annulus 51. The scraping blades 58 are then placed in position between the front and the rear pivot supports 62 and 107 with the pivots 57 registering therewith, and the outer dasher element is then drawn into place by tightening the nuts 52^1 on the bolts 52, thereby compressing spring 77, biasing the inner dasher element rearwardly against the rear plate of the outer dasher element to hold the annulus 106 in sealing engagement with the flange 65 of the bushing 64. The outer coil spring 81 is then telescoped over the bushing 72, which is then telescoped over the end shaft 35 into the keyed aperture of hub 56 of the front spider 55 until the slots 73 in the inner end of the bushing 72 engage the axially extending lugs on the annulus 75. To complete the assembly of the agitating mechanism the stud bearing 63 is telescoped over the end of the shaft 35, compressing spring 81 sufficiently to permit the insertion of the key ring 78 into the groove 79 at the extreme forward end of the shaft 35.

The assembled dasher is then inserted into the freezing shell 37 with the quill shaft 36 telescoped through the bearing neck 48 in the rear cylinder head 40 and into the quill shaft 23 provided with a squared inner surface to drivingly engage the squared outer surface of the end of the quill shaft 36. This arrangement provides the driving connection for the outer dasher element and similarly, and at the same time, the squared end of the inner shaft 35 engages the square socket in the front end of the sprocket wheel shaft 25 to provide the driving connection for the inner agitator element. Upon closing the freezer door 41, the conical bearing seat 47 forces the stud bearing 63 against the front end of the bushing 72 to further compress the spring 81, thereby biasing the outer dasher mechanism for movement in a rearwardly direction, holding the rear face of the rear spider plate 50 in sealing engagement with the sealing bearing 82 in the inner face of the rear processing chamber head 40. In the operation of the agitator and whipping mechanism, as previously pointed out, the inner and outer members therefore may be rotated in opposite directions. For this reason it has been advisable to supply the special spring engaging flanges 80 and 76 or the members 72 and 75 respectively, to engage the ends of the springs 77 and 81 thereby to rotate the springs with the outer dasher mechanism due to the keyed engagement of the bushing 72 with the inner periphery of the hub 56 of the front spider 55, and transfer the biasing pressure of the springs through the flanges 76 and 80 to the oppositely rotating element of the inner agitator mechanism. Such construction will avoid the winding or unwinding of the springs 77 and 81, which winding or unwinding would occur if the flanges beforementioned did not rotate with the front spider 55, due to the fact that the ends of the springs 77 and 81 adjacent the spider 55 would engage it and tend to rotate therewith, while the opposite ends would engage oppositely rotating elements. The rotation of the bushing 72 with the hub 56 is secured by providing squared faces 71 on the outer surface of the bushing 72 to engage complementary faces on the interior of the hub 56.

In the operation of the freezer, ice cream mix supplied to the reservoir is admitted to the freezing or processing chamber defined by the shell 37 through valve 46 and the refrigerant is started or stopped by means of the stop valve 91, which valve admits the precooled refrigerant from the automatic control valve 90 into the con-

duits associated with the evaporator "C".

The evaporator associated with the processing or freezing chamber, the method of constructing the evaporator, and the means for placing the evaporator quickly into and out of operation at will, are covered by the claims of our co-pending Application No. 1066/40 (Serial No. 538,188.

The construction of the evaporator jacket and refrigerating system is described hereinabove in order to show the relationship of the evaporator and refrigerating system with respect to the entire unit in which they are employed; however, such construction is not claimed in the present application but is claimed in our copending application No. 1066/40 (Serial No. 538,188).

The foregoing detailed description has been given for clearness of understanding only, and no unnecessary limitations shall be understood therefrom. Various changes in arrangement of the agitator for the freezer as shown and described may be made in accordance with the common knowledge of those skilled in the art, and yet come within the scope of the invention as set forth in the appended claims.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. An agitator for ice cream freezers and other machines, said agitator including inner and outer separable members, and driving and supporting means for said outer member detachably affixed thereto and rotatively supporting the corresponding end of said inner member, whereby, when said driving means is detached from said outer member, said inner member may be separated from said outer member.

2. An agitator for ice cream freezers and other machines, said agitator including inner and outer separable members, and driving means and a supporting means for said outer member with the supporting means detachably affixed thereto and rotatively supporting the outer separable member on the inner member, whereby, when said supporting means is detached from said outer member, said inner member may be separated from said outer member.

3. An agitator according to claim 1 or 2, including relatively rotatable inner and outer members, and means readily detachable from the end of the outer agitator member opposite to the end to which the driving means is affixed, for rotatably supporting said opposite end of said outer agitator member whereby, when said detachable means is detached from said opposite end of the outer member, the inner agitator member may be readily withdrawn from said outer member.

4. An agitator according to claim 1, 2 or 3, wherein said means rotatively support said outer member at said opposite end upon the corresponding opposite end of said inner member, and removable bearing means are associated with the inner member at said opposite end for suporting the same, whereby said inner and outer members may be separated upon the removal of said bearing and detachment of the detachable supporting means.

5. An agitator according to claim 1, 2, 3 or 4, wherein the inner agitator is mounted on a shaft, a support is provided for one end of said shaft, the outer agitator is supported at one end thereof for rotary motion relative to said inner agitator by a support spider swiveled to the shaft of said inner agitator adjacent said support therefor, support means is provided for the opposite end of said outer agitator removably attached to an apertured end plate of a hollow drive shaft for said outer agitator embracing the other end of the shaft of said inner agitator to support the same, and spring means carried by said agitators biasing the inner agitator for axial movement relative to the outer agitator to maintain them in relative axial position with respect to one another.

6. An ice cream freezer or other machine, including an agitator according to any of the preceding claims, said agitator being supported for rotary movement within a processing chamber.

7. A machine according to claim 6, wherein the agitator means is supported by shaft means extending through an aperture of an apertured end wall of said processing chamber, and sealing means is carried by said agitator for sealing said aperture about said shaft means.

8. A machine according to claim 7, wherein said sealing means includes a portion of said agitator means and a bearing element embracing said aperture, spring means being provided for yieldably maintaining said aperture sealing means in sealed position.

9. A machine according to claim 7 or 8, having a door for the processing chamber and means for biasing said agitator for movement toward the apertured wall when said door is closed for yieldably maintaining the bearing means embracing said aperture and the complementary bearing means carried by the agitator in sealing engagement.

10. A machine according to claim 7, 8 or 9, wherein the agitator means has an end plate mounted for rotary movement within the processing chamber, agitator support and driving means extend through said aperture, and the sealing means embrasing said aperture includes a bearing element in said apertured wall, and spring means for yieldably maintaining said end plate and said sealing means in sealing engagement to seal the aperture in said wall.

11. A machine according to claim 8, 9 or 10, having bearing means within a door on the processing chamber for supporting a bearing on the agitator, said spring means or biasing means being subject to the pressure of said bearing when said door is closed for yieldably maintaining the aperture sealing means in sealed position.

12. A machine according to claim 6, having agitator support means carried by a door at one end of the processing chamber, and means biasing said agitator for yieldably maintaining it in a predetermined position within said chamber.

13. A machine according to claim 12, wherein a bearing is carried by said agitator to cooperate with said support means, and spring means bias said agitator for yieldably maintaining the agitator in a predetermined position within said chamber and for maintaining said bearing within said support means when said door is closed.

14. A machine according to any of the preceding claims 6 to 13, including a bearing on the agitator for seating in a bearing seat on the door of the processing chamber, and spring means biasing said bearing for yieldably maintaining it in said bearing seat when said door is closed.

15. A machine according to claim 12, 13 or 14, wherein the agitator is removably supported within the processing chamber, driving and support means for said agitator extend from the processing chamber through an aperture in a wall of the processing chamber, and operative sealing means for said aperture include a portion of said agitator.

16. A machine according to any of the preceding claims 7 to 11 or claim 15, wherein the sealing means is responsive to the axial movement of the biased agitator to place said sealing means in sealing engagement to seal the aperture around the shaft means for driving the agitator.

17. A machine according to any of the preceding claims 6 to 16, wherein the agitator means has inner and outer relatively rotatable elements housed within the processing chamber, inner and outer shaft means extend into said chamber through an aperture in an end wall thereof for relatively rotating said inner and outer agitating elements respectively, rotary sealing means encompassing said inner and outer shaft means respectively to sealingly engage complementary rotary sealing means carried by said outer shaft and said end wall respectively, and spring means for biasing said sealing means for maintaining them in sealing engagement with said complementary sealing means when said agitator means is in operative position within said chamber.

18. An agitator for ice cream freezers and other machines or an ice cream freezer or other machine including said agitator, having its parts constructed and adapted to operate substantially as herein described with reference to Figures 1 to 10 inclusive of the accompanying drawings.

Dated this 16th day of January, 1940.

For: CHERRY-BURRELL CORPORATION.

Stevens, Langner, Parry & Rollinson,
Chartered Patent Agents,
5—9, Quality Court, Chancery Lane,
London, W.C.2, and at
120, East 41st Street, New York City,
N.Y., U.S.A.

Leamington Spa: Printed for His Majesty's Stationery Office, by the Courier Press.—1941.

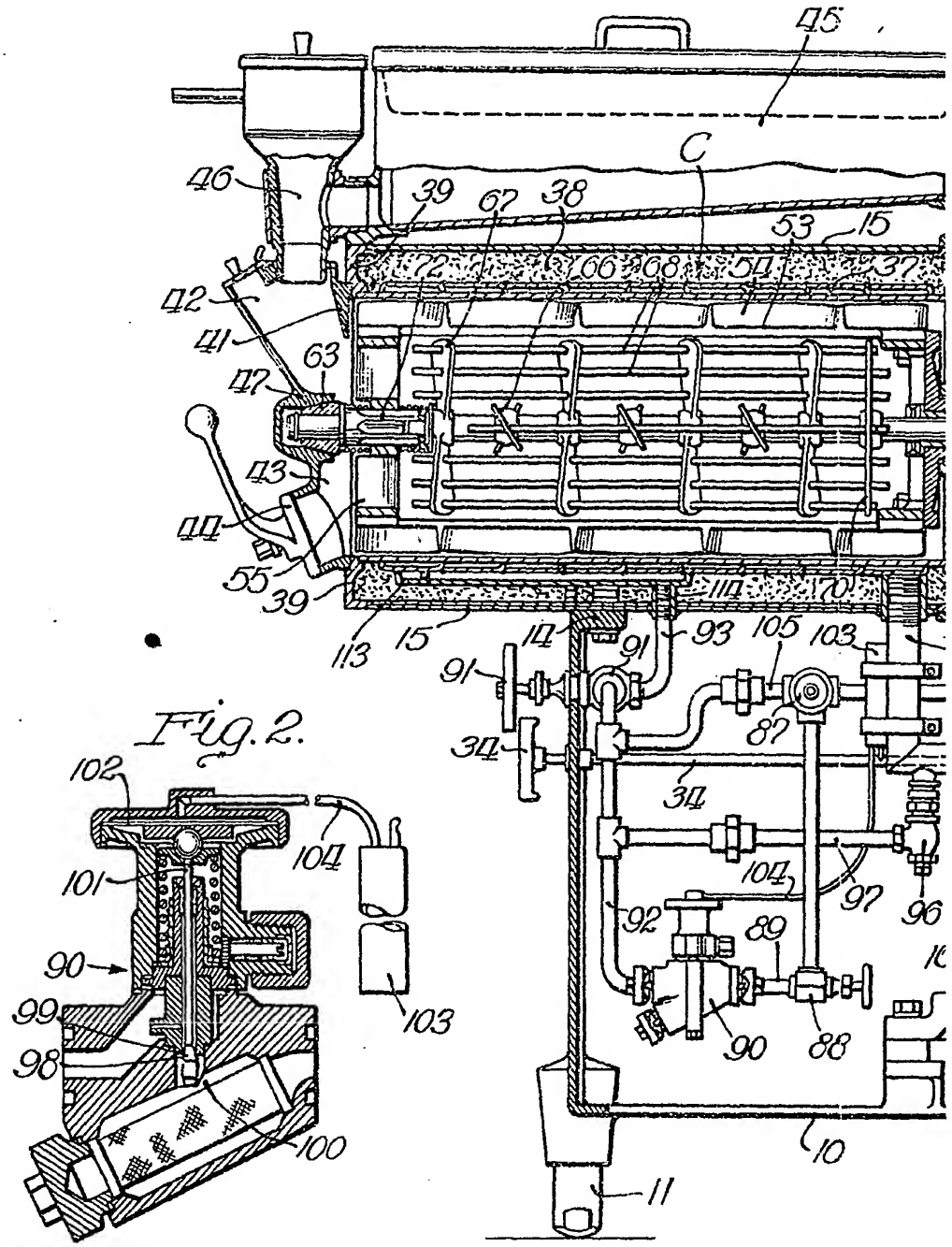


Fig. 2.

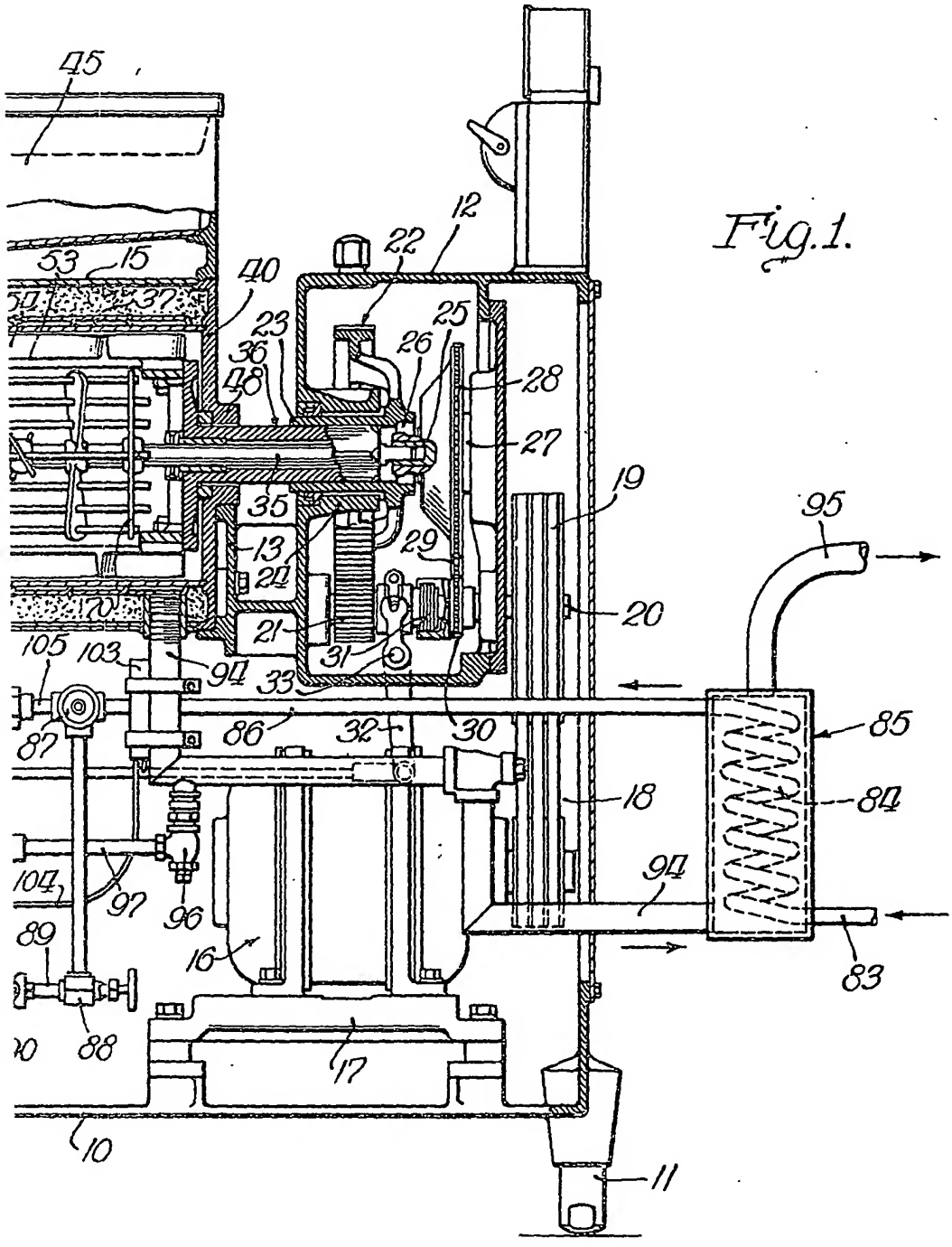


Fig.1.

Malby & Sons, Photo-Litho

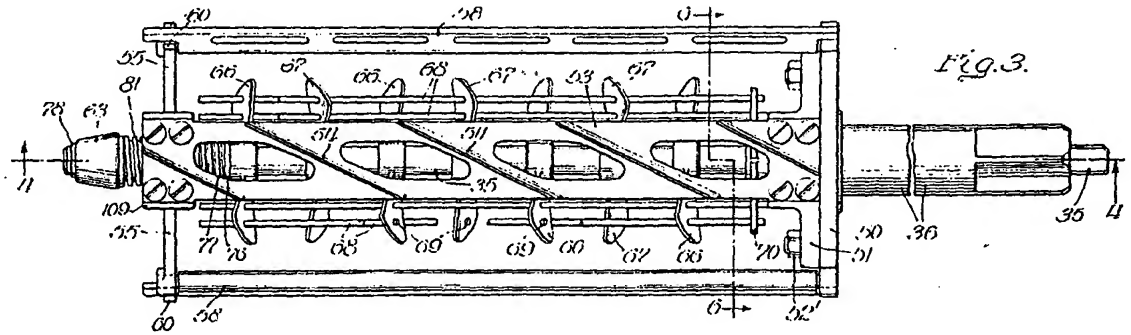


Fig. 3.

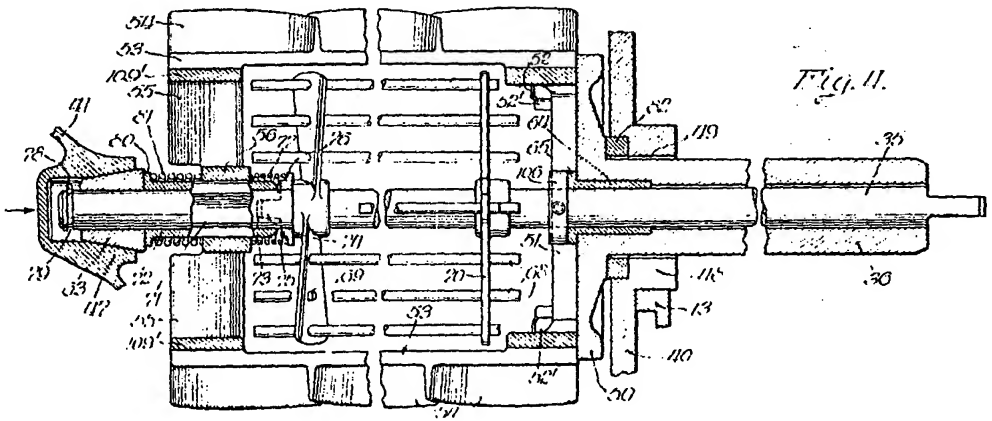
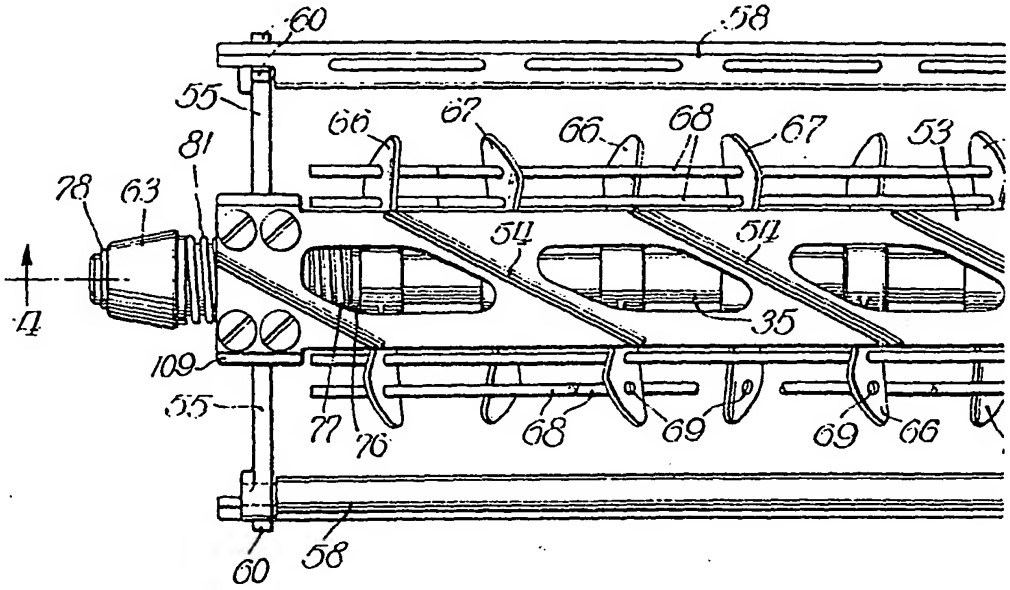
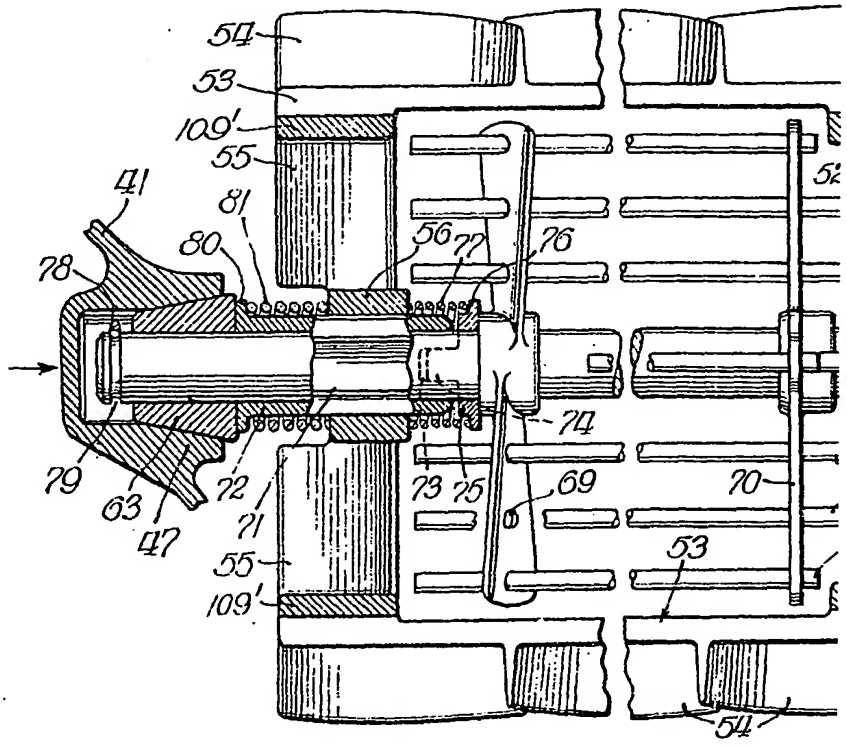


Fig. 11.





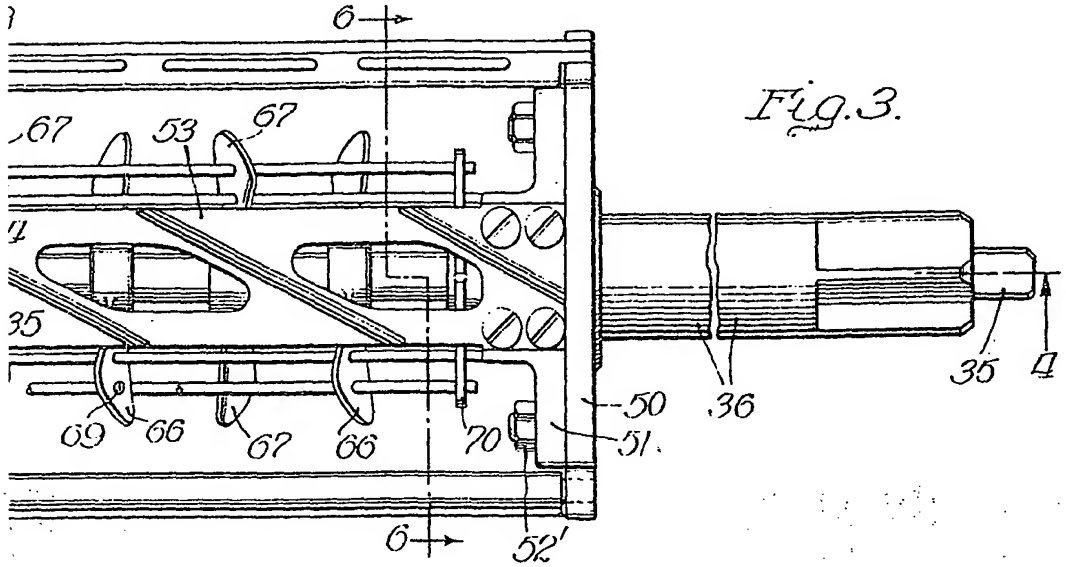

6
67
53
67
35
69
66
67
66
70
50
36
51
35
4
6
52'

Fig. 3.

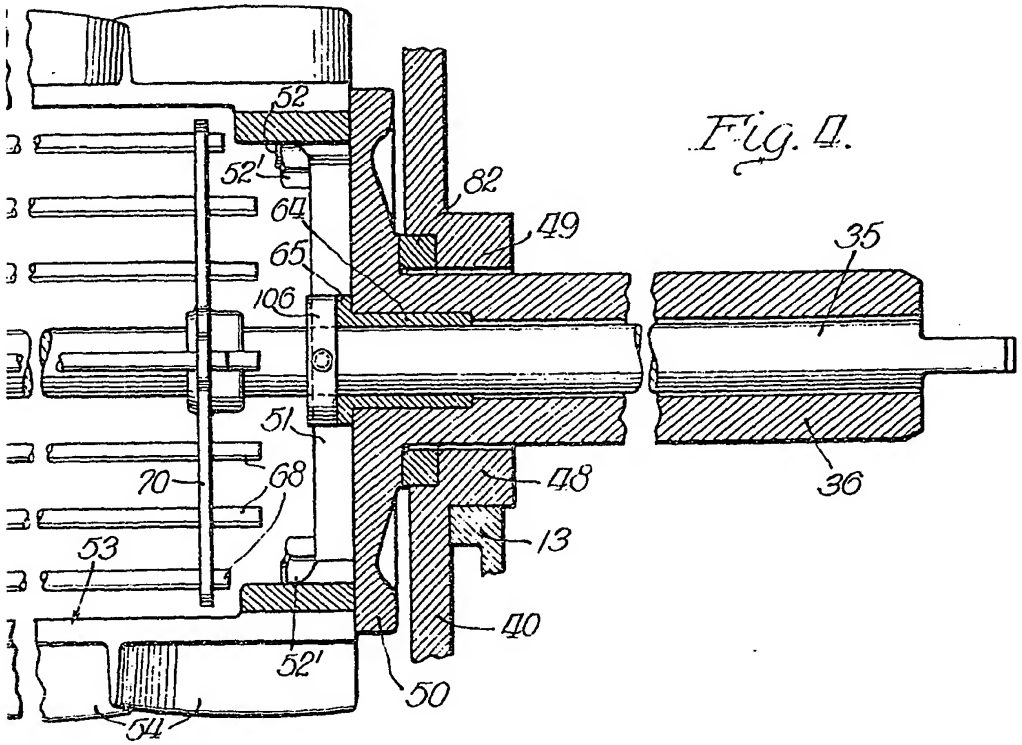

52
52'
82
64
49
65
106
35
51
70
68
48
36
53
13
40
52'
50
54

Fig. 4.

538,187 COMPLETE SPECIFICATION

4 SHEETS SHEET 1

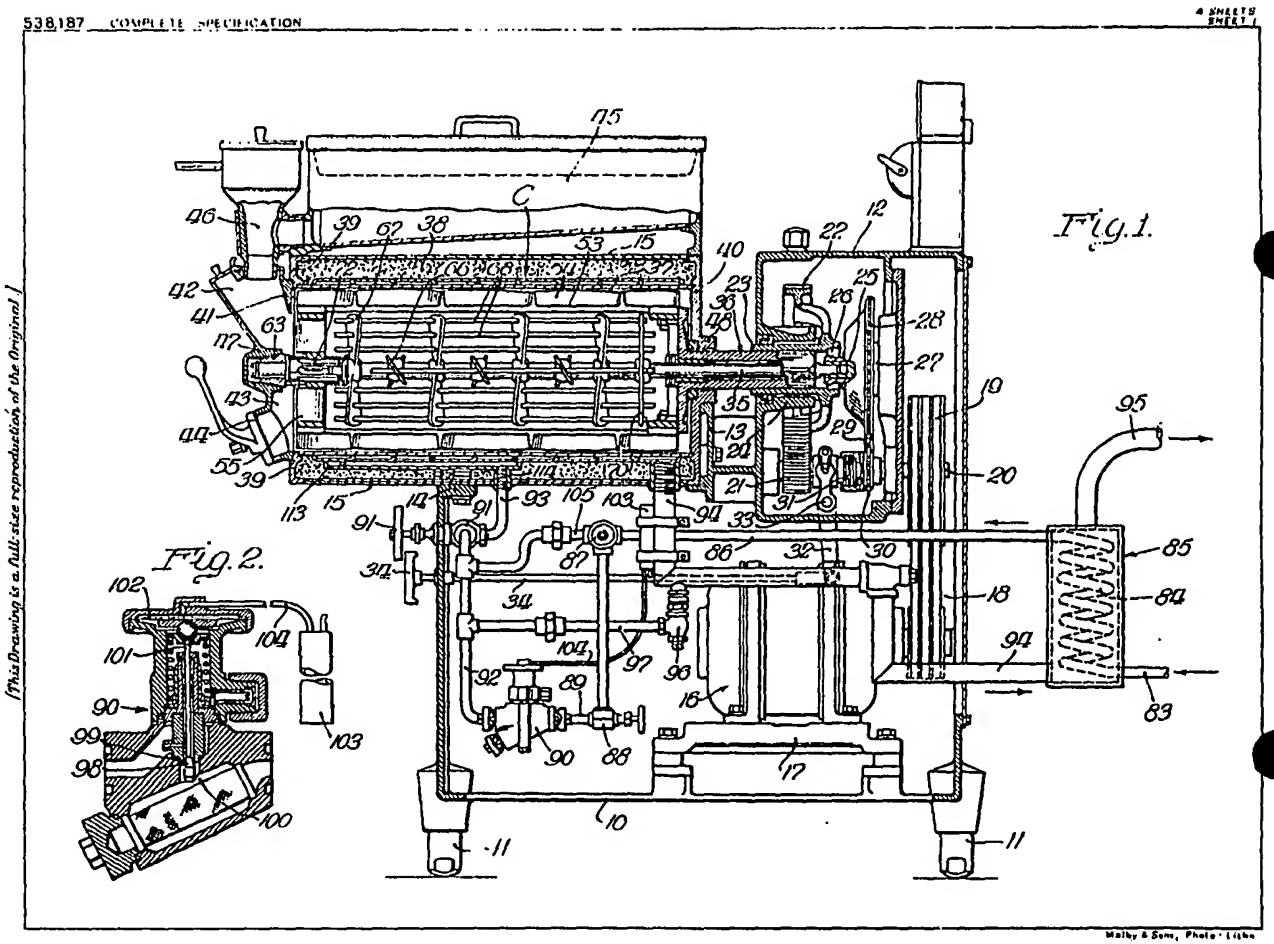


Fig. 1.

Fig. 2.

[This Drawing is a full-size reproduction of the Original]

Malby & Sons, Photo-Litho

Fig. 5.

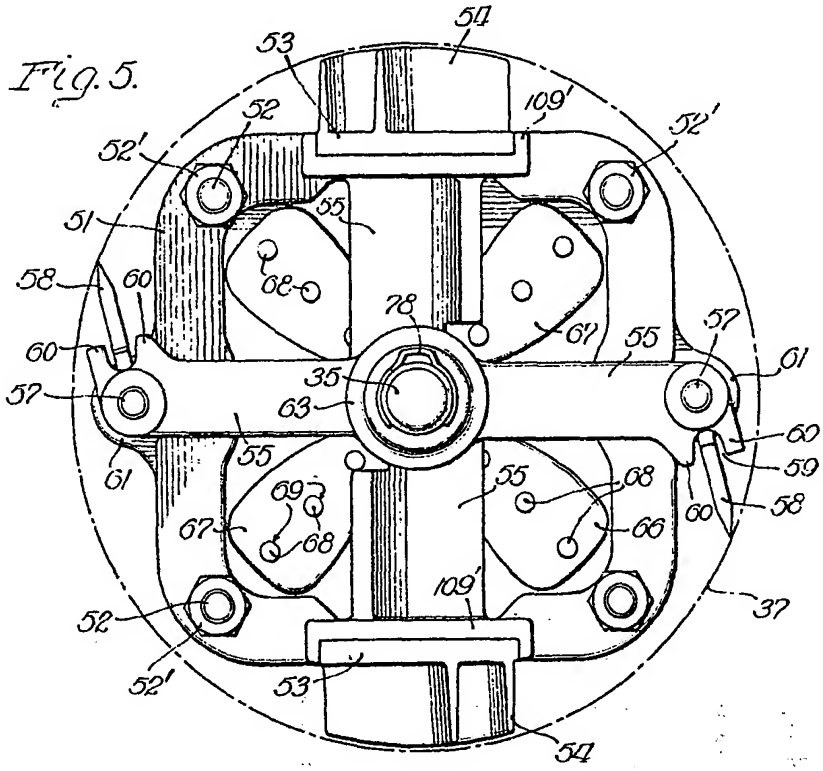


Fig.

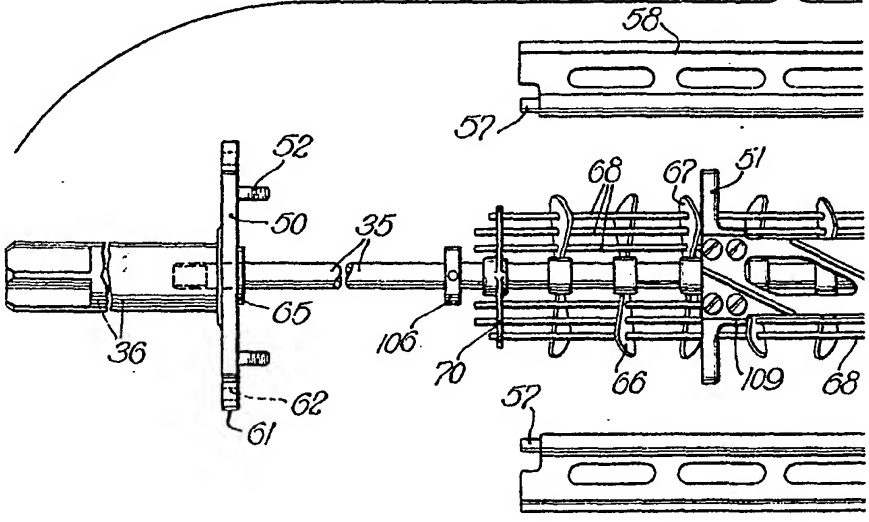


Fig. 6.

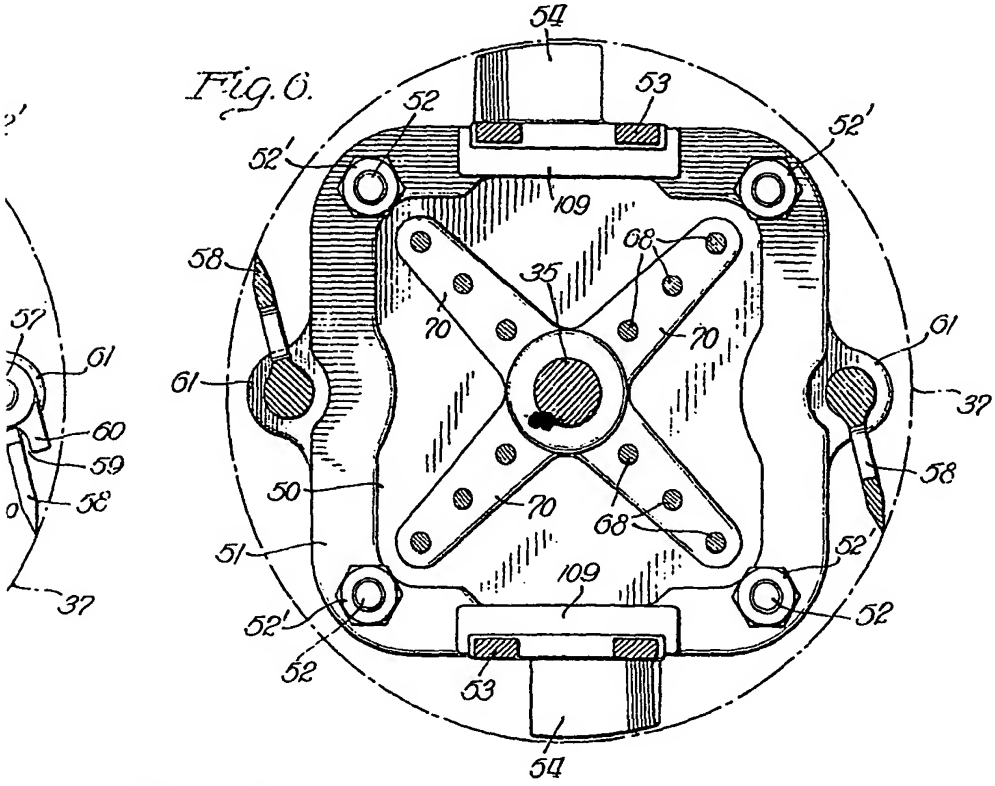
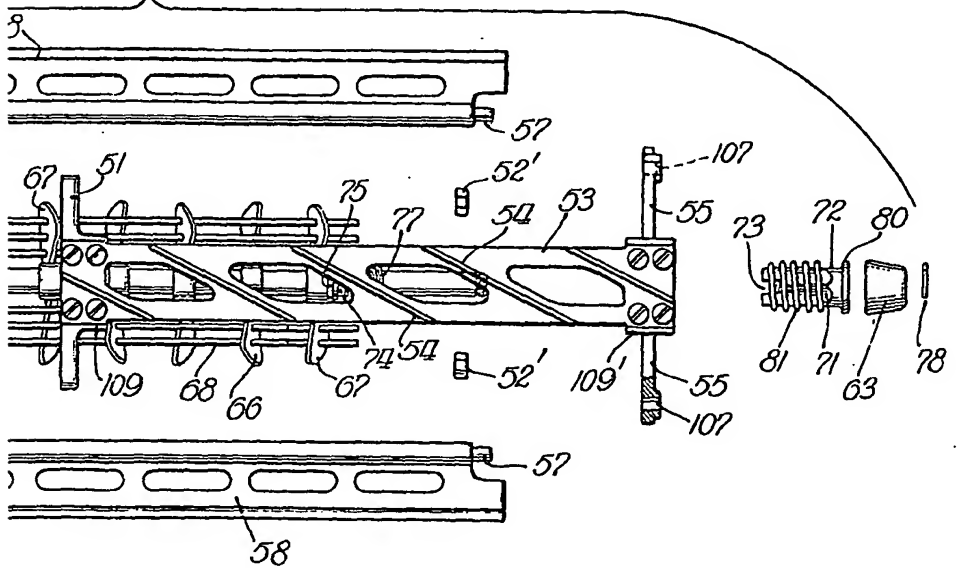


Fig. 7.



Malby & Sons, Photo-Litho

[This Drawing is a reproduction of the Original on a reduced scale.]

Fig. 5.

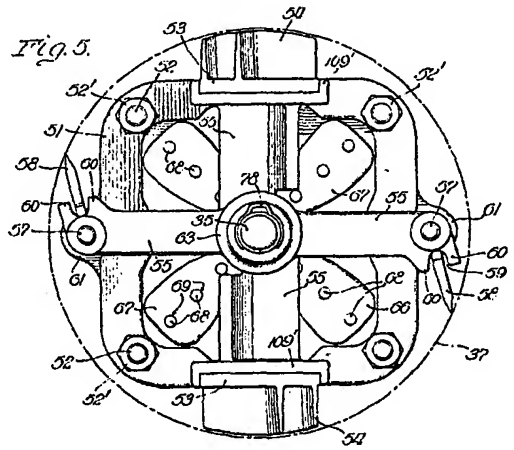


Fig. 6.

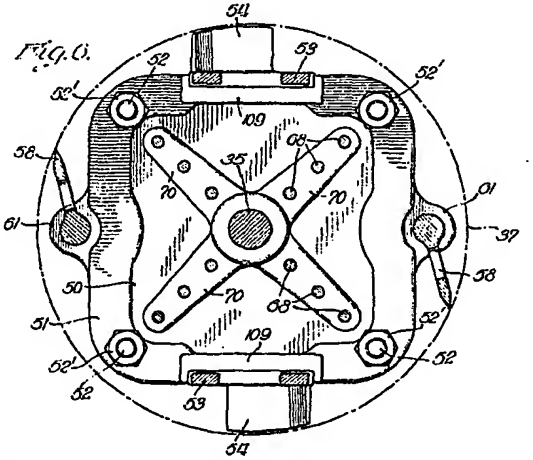
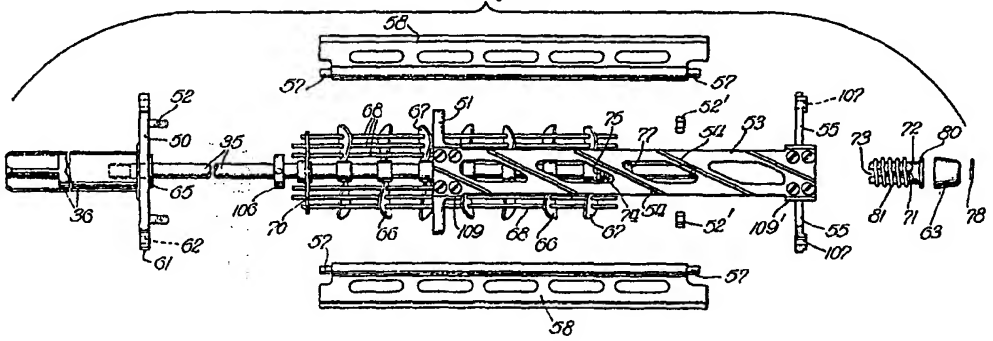


Fig. 7.



Malby & Sons, Photo-Litho

Fig. 8.

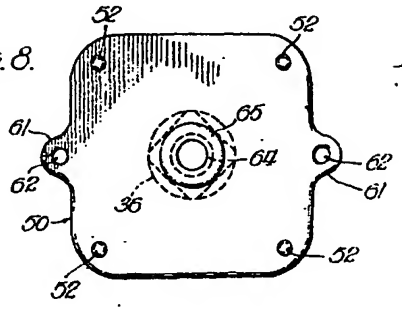
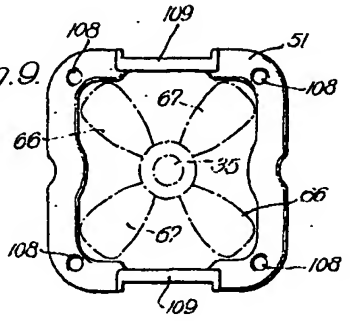


Fig. 9.



Malby & Sons, Photo-Lith